OPERATING INSTRUCTIONS

for vertical sterilizer

K S G 40/60-2
K S G 50/70-2
K S G 50/80-2

- double-walled execution -

with **electric motor vacuum pump**

for sterilization of **unwrapped** and **wrapped, solid** and **porous** hospital utensils
as instruments, textiles, glass, rubber and plastic goods

Modifications reserved. 18.01.07
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1. Description

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Order-No.	**178892**
Aukl-No.	**Aukl 002 069**
Apparatus No:	**7512**
Year of construction:	**2007**

Full mark of steam sterilizer:

KSG 40/60-2 double-walled electrically heated	Aukl 002 067
KSG 50/70-2 double-walled electrically heated	**Aukl 002 069**
KSG 50/80-2 double-walled electrically heated	Aukl 002 077

1.1. Intended use of the unit

This execution of sterilizer **with** *electro motor vacuum pump* can be used for sterilization of **unwrapped** and **wrapped** porous (like Textile) and solid (like instruments, glass) goods, at a sterilization temperature of **134 °C** and **unwrapped** and **wrapped** rubber and plastic goods at a sterilization temperature of **121 °C**, if is worked after the fractionated vacuum procedure. By suitable application of the fractionated vacuum procedure the sterilisation of hollow bodies (pipes, tubes) is also possible. Hollow receptacles may preferably be sterilized opening downward.

The operator is obliged to validate every loading configuration in a suitable procedure.

Solutions, independent from the size of the receptacles, may not be sterilized in this sterilizer.

In no case inflammable materials may be sterilized.

No living beings may be sterilized.

The device is not been suitable for the sterilisation (destruction) by the lab goods which were submitted to a **chemical and** / **or biological** treatment. Such treated goods may **not** be sterilized.

1.2. Intended aim

The aim of sterilization is the achievement of the sterility of a sterilizer load (charge) acc. to the sterilizing process.

Hint: Sterile is the condition of a (medical) product, which is free from active micro organisms (EN 556).

2. Installation

2.1 Read the operating instructions before setting the apparatus into operation.

2.2 Take care that power supply is in accordance with regulations.

2.3 Take care for electrical connection, see Technical Data -see type plate.

2.4 **Attention:** Install main switch on site.

2.5 Take care for cold water connection for electric motor vacuum pump (28) at the electromagnetic valve (29).

2.6 Take care that under the sterilizer there is a water outlet (e.g. gully) for the waste pipes of the sterilizer.

2.7 To guarantee the stability of the sterilizer, the apparatus feet (32) have to be fixed to the ground.

2.8 If the sterilizer is not used, close the local hand valve for cooling water (29).

3. General Remarks

Feeding water: For operation of the sterilizer either distilled, demineralized or completely desalted water is necessary.

Indications concerning the filling quantity of operating water for steam jacket in case of empty chamber until min. water level (NW) and from minimum water level (NW) to max. level (HW) can be taken from paragraph **11. Technical data**.

Two radiators (10).

Water shortage sensor (11) with micro heating element 0,5 kW and water shortage protected switch (11a), resettable.

Regulator and adjustor for steam jacket pressure (21), max. 2,5 bar.

4. Operating Instructions

For setting the sterilizer into operation, please proceed as follows:

4.1. Control of feeding water

Level of feeding water (distilled or demineralized water) at the water level glass (6) has to be between the markings for minimum and maximum water level. Should this not be the case, the outer chamber (2) has to be filled with a corresponding quantity of water. **This can only be done when the outer chamber (2) is without pressure resp. cold, i.e. the pressure gauge for the steam jacket (20) indicates "0" bar.**

Filling in of jacket water for first filling or after having emptied the jacket completely or in case of cold, pressureless outer chamber

Open the sterilization valve (9).

Open the function safety valve (23) by means of the operating lever (24), if the sterilizer lid (3) is closed.

Open the filling valve (5).

Fill in distilled or demineralized water into the filling funnel (4) until water level (6) has reached the maximum marking.

Close the filling valve (5).

Close the sterilization valve (9).

4.2. Pressure Adjustment – 1,2 bar – 121 °C

4.2.1. The saturated steam necessary for sterilization is produced in the steam jacket (2) by means of two electric radiators (10). To start the heating process, please proceed as follows:

4.2.2. Control the water level at the water level indication (6) and add water, if necessary.

4.2.3. Control that filling valve (5) and sterilization valve (9) are closed.

4.2.4. Adjust the sterilizing pressure on the adjusting device (21) as shown in table 7, so that the working pressure (jacket pressure) is approx. 0,1-0,2 bar higher than the required pressure (1,2 bar).

4.2.5. Press ON/OFF switch (13) to "ON"-position (control lamp lights green) to start the jacket heating procedure. Now the initiated heating process lasts approx. 20 min., when there is maximum water level and maximum required pressure (approx. 1,2 bar), until the necessary steam pressure is reached. As long as the operating pressure is not reached, heating is in operation. This can be seen by the lighting of the yellow control lamp "heating" (16). The process of jacket preheating is finished when the pressure gauge for the steam jacket (20) indicates the pressure preselected on the adjusting device for sterilizing pressure and the yellow control lamp "heating" (16) goes out for the first time. Now the jacket is ready for sterilization.

4.3. Pressure Adjustment – 2,4 bar – 134 °C

4.3.1. The saturated steam necessary for sterilization is produced in the steam jacket (2) by means of two electric radiators (10). To start the heating process, please proceed as follows:

4.3.2. Control the water level at the water level indication (6) and add water, if necessary.

4.3.3. Control that filling valve (5) and sterilization valve (9) are closed.

4.3.4. Adjust the sterilizing pressure on the adjusting device (21) as shown in table 7, so that the working pressure is approx. 0,1-0,2 bar higher then the required pressure (2,4 bar).

4.3.5. Press ON/OFF switch (13) to "ON"-position (control lamp lights green) to start the jacket heating procedure. Now the initiated heating process lasts approx. 30 min., when there is maximum water level and maximum required pressure (approx. 2,4 bar), until the necessary steam pressure is reached. As long as the operating pressure is not reached, heating is in operation. This can be seen by the lighting of the yellow control lamp "heating" (16). The process of jacket preheating is finished when the pressure gauge for the steam jacket (20) indicates the pressure preselected on the adjusting device for sterilizing pressure and the yellow control lamp "heating" (16) goes out for the first time. Now the jacket is ready for sterilization.

4.4. Heating / preheating of the sterilizer

The saturated steam necessary for sterilization is produced in the steam jacket (2) by means of two electric radiators (10). To start the heating process, please proceed as follows:

4.4.1. Control the water level at the water level indication (6) and add water, if necessary (see chapter 4.1).

4.4.2. Control that filling valve (5) and sterilization valve (9) are closed.

4.4.3. Press ON/OFF switch (13) to "ON"-position (control lamp lights green) to start the jacket heating procedure.

4.4.4. Now the initiated heating process lasts approx. 20 min. until 30 min., until the necessary steam pressure is reached. As long as the operating pressure is not reached, heating is in operation. This can be seen by the lighting of the yellow control lamp "heating" (16).

4.4.5. The process of jacket preheating is finished when the pressure gauge for the steam jacket (20) indicates the pressure preselected on the adjusting device for sterilizing pressure and the yellow control lamp "heating" (16) goes out for the first time. Now the jacket is ready for sterilization.

4.5. Loading of the sterilizer

4.5.1. Please classify the sterilizing goods acc. to sterilizing temperature and time (see table 7).

4.5.2. If necessary/scheduled, put the sterilizing goods into the provided **baskets, drums or boxes** (accessories).

4.5.3. Place the sterilizing goods into the sterilizing chamber (1) and put them on the ground plate resp. on the trays (accessories). The chamber can be filled up until its upper edge.

4.6. Close sterilizing lid

4.6.1. To that end turn the lid by the operating handles (3a) counter-clockwise until the limit stop.

4.6.2. Then tilt the lid downwards until it lies on the gasket (33).

4.6.3. Afterwards please turn the lid by means of the operating handles (3a) in clockwise direction until the limit stop. The lid is closed properly when the red markings (22) are one above each other.

4.6.4. At last close the function safety valve (23) with the operating lever (24). This process is executed properly when the lever (24) is situated in the intended groove of the link of the operating handle.

Attention: Only by this procedure it is secured that the chamber lid and the function safety valve are closed orderly and pressure in the sterilizing chamber can be produced after opening the sterilization valve.

4.7. Pre vacuum procedure for unwrapped, solid goods

This system may be used **only** to the sterilization of **unwrapped**, **non-porous** solid goods like instruments, glass at a sterilization temperature of **134 °C** and rubber and plastic at a sterilization temperature of **121 °C**.

The operator is obliged to validate every loading configuration in a suitable procedure.

To prepare the sterilizing chamber and the goods for the following sterilizing process, an evacuation of the air from the sterilizing chamber and the goods **must** be executed.

Control and ***close the aeration valve (34)***, if necessary.

open the release valve for chamber pressure (25)

and then ***press switch (13a)*** for setting the electric motor vacuum pump (28) and the cold water magnetic valve (29) into operation (control lamp lights green).

The efficiency is depending on the vacuum influence time, the height of the achieved vacuum and the type of goods to be sterilized.

To finish the process of evacuation

close the release valve for chamber pressure (25)

and switch off the vacuum pump (28) and the cold water magnetic valve (29) by ***actuating switch (13a)*** again (green control lamp goes out).

4.8. Fractionated Vacuum procedure for wrapped, solid and porous goods

This system **must** be used to the sterilization of **unwrapped and wrapped**, **non-porous** and **porous** goods, like instruments, glass and textiles at a sterilization temperature of **134 °C** and to the sterilization of **unwrapped** and **wrapped**, **non-porous** and **porous** goods like rubber and plastic at a sterilization temperature of **121 °C**. The procedure according to the fractionated Vacuum procedures also allows the sterilisation of hollow bodies.

The operator is obliged to validate every loading configuration in a suitable procedure.

Especially for porous goods, as textiles and solid goods as hollow bodies, it is necessary to have a good air removal from the chamber and the goods to be sterilized before sterilization. This can be achieved by the repeated (4-6 times) use of the vacuum pump (evacuation) alternating with steam pushes.

Control and ***close the aeration valve (34)***, if necessary.

Start evacuation

press switch (13a) for setting the electric motor vacuum pump (28) and the cold water magnetic valve (29) into operation (control lamp lights green).

open the Release valve for chamber pressure (25).

The efficiency is depending on the vacuum influence time, the height of the achieved vacuum, the quantity of vacuums (fractionated vacuum) and the type of goods to be sterilized. The low pressure value is indicated at the Pressure gauge for sterilizing chamber (19).

The achievement of a chamber low pressure value of at least -0,85 bar (150 mbar absolute pressure) is recommended. Take into consideration: The lower the achieved low pressure is during evacuation, the better the air dilution factor.

Stop evacuation

close the release valve for chamber pressure (25)

switch off the vacuum pump (28) and the cold water magnetic valve (29) by ***actuating switch (13a)*** (green control lamp goes out).

Start steam push

careful opening of the sterilization valve (9).

The value of steam push should be 0,5 – 0,7 bar (1500 - 1700 mbar absolute pressure).

The pressure value is indicated at the Pressure gauge for sterilizing chamber (19).

Stop steam push

complete close of the sterilization valve (9).

This expiry is to be repeated from about **four** to **six** times completely. The number of the repetitions is dependent on loading.

The more often this process is explained, the aeration of the chamber and the load is the more actually. The steam penetration required for the successful sterilizing process is prepared by evacuating the air

4.9. Start sterilizing

Before the sterilization process starts, control the adjustment of the sterilizing pressure (21). Compare the pressure of the outer chamber at the pressure gauge for the jacket (20) (actual value) when the control lamp "Heating" (16) has gone out with the adjusted value acc. to table 7 for the goods to be sterilized and readjust the device (21), if necessary (see chapter 4.2 and 4.3).

Control the release valve for chamber pressure (25) for the sterilizing chamber (1) and close it, if still open.

When the operating pressure necessary for sterilization is reached in the outer chamber (jacket) (to be seen at the pressure gauge (20) for the steam jacket (2))

open the sterilization valve (9)

Now the heating-up time starts. Steam is streaming from the outer chamber (2) into the sterilizing chamber (1). This can be observed at the pressure gauge (19) for the sterilizing chamber. Simultaneously the temperature for the sterilizing chamber is also increasing (to be seen at the pointer thermometer (34) for the sterilizing chamber).

Remark

a) When steam flows from steam jacket (2) into sterilizing chamber (1), the pressure in the outer chamber decreases - to be seen at the pressure gauge (20) for the outer chamber. Via the adjusting device for sterilizing pressure (21) the radiators are switched on automatically - to be seen on the yellow control lamp "heating" (16).

b) The air in the sterilizing chamber is displaced by the entering steam and is led off via the automatic aerator and deaerator (26). At a temperature of 100 °C and higher, this component is closed, thus rendering possible that the steam pressure of the sterilizing chamber is reduced.

Attention: The sterilizer lid (3) is hot during operation !

When the indication of both pressure gauges (19 and 20) is identical, i.e. the pressure in the sterilizing chamber corresponds to the pressure adjusted acc. to table 7 - the same refers to the temperature - the sterilizing time can be measured.

It is the task of the operating personal to secure (by a suitable timer) that the goods to be sterilized are subject to the sterilizing temperature for the complete time adjusted acc. to table 7. For controlling the actual temperature, use the pointer thermometer (34).

When the temperature is lower than the adjusted temperature the measurement of the sterilizing time **has to be stopped** and can only be continued when the sterilizing temperature is reached again.

4.10. End sterilizing

After the end of the sterilizing time the sterilizing process must be ended.

The sterilization valve (9) has to be closed now.

The closing of the sterilizing valve (9) has the effect that the steam flow between outer chamber (2) and sterilizing chamber (1) is interrupted.

4.11. Start vacuum drying

Press switch (13a) for setting the electric motor vacuum pump (28) and the cold water magnetic valve (29) into operation(control lamp lights green).

Afterwards ***open the release valve for chamber pressure (25)*** carefully.

By this method the steam is pressed away by the inner pressure in the chamber. Then the sterile goods are dried by the vacuum produced by electric motor vacuum pump. The degree of drying depends on the vacuum influence time, the height of the achieved vacuum and the type of goods. At least 15-minute drying time should be kept.

4.12. End vacuum drying

close the release valve for chamber pressure (25) and

Press switch (13a) for switch off the vacuum pump (28) and the cold water magnetic valve (29) (green control lamp goes out).

4.13. Ventilation chamber

Pressure equalization in the chamber is reached by ***opening the ventilation valve (34)***
- **indication "0" bar at the pressure gauge for the sterilizing chamber (19)**.

4.14. Open the sterilizer lid

The sterilizer lid (3) may only be opened when the sterilizing chamber is pressureless and the sterilizing valve (9) is closed - Indication "**0**" bar at the pressure gauge for chamber (19).

For that purpose the function safety valve (23) is opened with the operation lever (24). The eventually remaining overpressure now escapes from the sterilizing chamber.

Attention: It is still possible that steam escapes at the exhaust tube of this valve.

By means of the operation handles the lid is turned until the limit stop and then opened.

Attention: It is still possible that hot steam escapes from the sterilizing chamber.

Now the - possibly still hot - sterile goods can be removed.

4.15. Removal of sterile goods

Now the - possibly still hot - sterile goods can be removed.

Attention: It is still possible that steam escapes from the sterilizing chamber.

4.16. Preparations for further sterilizations

After the chamber has been emptied, the sterilizer can quickly be prepared for the next charge, when is has been operated with vacuum drying.

Control the water level at the water level indication (6) and add water, if necessary.

Control and ***close the aeration valve (34)***.

4.17. Switching off of sterilizer

For final switching off of the sterilizer, e.g. after the last load of the day, the ON/OFF switch (13) has to be switched off (light goes out) and the main cock has to be closed.

5. Filling in of jacket water

Filling in of jacket water when the minimum marking is reached and the jacket is heated up and under pressure between two sterilizing processes.

The filling of jacket water can only be executed when the outer chamber (2) is without pressure.

If you observe that the water level has reached the minimum marking, the outer chamber (2) **must** be put into pressureless condition before filling jacket water into the jacket.

The outer chamber (2) becomes pressureless by self-radiation, e.g. by switching off the sterilizer at the on/off switch (13), so that the heating elements (10) are switched off.

If the sterilizer lid (3) is orderly closed you can additionally open the sterilization valve (9) and the release valve for chamber pressure (25) carefully by simultaneous press switch (13a) for setting the electric motor vacuum pump (28) and the cold water magnetic valve (29) into operation(control lamp lights green), so that a rapid pressure reduction of the jacket (2) via the sterilizing chamber (1) is reached.

Go forward in addition as follows:
Open the sterilization valve (9). Thus steam streams out of the jacket (2) into the sterilizing chamber (1).

Press switch (13a) for setting the electric motor vacuum pump (28) and the cold water magnetic valve (29) into operation(control lamp lights green), so that the escaping steam is cooled before entering the drain. Afterwards open carefully the reduction valve for chamber pressure (25). Now steam escapes to the drain.

When the pressure of the outer chamber (2) is "0" bar - pointer of pressure gauge (20) for the outer jacket must indicate "0" – press switch (13a) again for switch of the vacuum pump (28) and the cold water magnetic valve (29) and open the function safety valve (23) with the operation levers (24).

Afterwards open the filling valve (5) and fill in distilled or demineralized water in the filling funnel (4), until the water level has reached max. marking at the water level glass (6).

After the end of the filling process close the valves (5), (9) and (25).

When you have reset the unit into operation by actuation of the on/off-switch (13), the adjusted steam pressure is produced in the outer jacket.

Filling in of jacket water when the min. marking has been passed, the outer chamber (2) is heated up and under pressure and the water shortage protection switch (11a) has reacted.

The filling of jacket water can only be executed when the outer chamber (2) is without pressure.

If the red control lamp "water shortage" is illuminated at the electric switch board (12), the water level in the steam jacket has fallen below the admissible value during operation. Before filling the water into the outer chamber, it must be put into a **pressureless** condition.

The outer chamber becomes pressureless by self-radiation, e.g. by switching off the sterilizer at the on/off-switch (13), so that the heating elements (10) are switched off.

If the sterilizer lid (3) is orderly closed you can additionally open the sterilization valve (9) and the release valve for chamber pressure (25) carefully by simultaneous press switch (13a) for setting the electric motor vacuum pump (28) and the cold water magnetic valve (29) into operation(control lamp lights green), so that a rapid pressure reduction of the jacket (2) via the sterilizing chamber (1) is reached.

Go forward in addition as follows:
Open the sterilization valve (9). Thus steam streams out of the jacket (2) into the sterilizing chamber (1).

Press switch (13a) for setting the electric motor vacuum pump (28) and the cold water magnetic valve (29) into operation(control lamp lights green), so that the escaping steam is cooled before entering the drain. Afterwards open carefully the reduction valve for chamber pressure (25). Now steam escapes to the drain.

When the pressure of the outer chamber (2) is "0" bar - pointer of pressure gauge (20) for the outer jacket must indicate "0" – press switch (13a) again for switch of the vacuum pump (28) and the cold water magnetic valve (29) and open the function safety valve (23) with the operation levers (24).

Afterwards open the filling valve (5) and fill in distilled or demineralized water in the filling funnel (4), until the water level has reached max. marking at the water level glass (6).

After the end of the filling process close the valves (5), (9) and (25) and the function safety valve (23) by putting the operating lever (24) from horizontal to vertical pos. Afterwards switch on the unit at the on/off-switch (13).

Afterwards the water shortage protection switch (11a) has to be set into operation by pressing the reset button, which is situated behind the protection cover at the front side of the water shortage protection switch (11a). The red control lamp "water shortage" (17) goes out.

After having actuated the reset button, the heating elements are switched on again and the steam pressure adjusted at the regulator for sterilizing pressure (21) is produced in the outer jacket.

The sterilizing process interrupted by the water shortage *must* be repeated, as the goods have to be considered as *"not sterile".*

6. Security facilities

6.1. Water shortage in the steam jacket

A sensor (11) is built in above the radiators, so that they cannot burn through in case of extreme shortage of distilled resp. demineralized water. The sensor consists of a small radiator with integrated temperature sensor. In case of water shortage the temperature sensor - heated up by the small radiator - gives a signal to the water shortage protected switch (11a). Via a contactor (10a) this switch durably separates the radiators (10) and the small radiator in the water shortage sensor (11) from electric mains. At the same time the red control lamp "water shortage" (17) lights up.

To remove the water shortage, proceed as described in point 5.

When the water shortage has been removed by refilling of water, the reset button has to be pressed at the water shortage protection switch. Thus the red lamp (17) "water shortage" extinguishes. Sterilization can be started again.

6.2. Function safety valve

When the sterilizer lid is orderly closed, this valve (23) prevents by its operation lever (24) that the lid can be opened when the sterilizing chamber is under pressure. If anyone tries to open the chamber nevertheless, the lever (24) has to be operated first. This would mean that via the activated valve (23) possibly existing pressure would be reduced and be led away via the exhaust pipe.

6.3. Sterilizer lid

The sterilizer lid is opened and closed by a turning bayonet system. Because of the occurring friction (and because of 6.2) it is not possible to operate the lid bayonet in direction "open" when there is pressure inside. Should the lid be opened - due to an accumulation of miss functions (depending on the apparatus or on wrong operation) - when there is still a remaining pressure inside the chamber, this inner pressure presses the lid into catch hooks, before it can be opened completely. Due to the arrangement of these hooks the remaining pressure between chamber and lid can escape, but a dangerous flying open of the lid is surely prevented.

6.4. Overpressure safety device

If the radiators (10) are not switched off due to a failure of the regulator for sterilization pressure (21) and an inadmissible high steam pressure is established in the outer chamber, the safety valve (30) reacts upon an overpressure of more than 2,5 bar. It opens the way outside, removes safely the surplus pressure via a tube, thus preventing dangerous overpressure in the outer chamber.

In case of reaction of the safety valve, switch off the apparatus by the ON/OFF switch (13) and examine the apparatus.

7. Table

Goods to be sterilized	Method of vacuum	Sterilizing pressure	Sterilizing temperature	Sterilizing time	Method of drying
unwrapped Rubber - Plastic	fractionated vacuum	1,2 bar	121 °C	25 Min.	vacuum drying at least 15 minutes
wrapped Rubber - Plastic	fractionated vacuum	1,2 bar	121 °C	20 Min.	vacuum drying at least 20 minutes
unwrapped Utensils Instruments	pre vacuum	1,2 bar 2,4 bar	121 °C 134 °C	20 Min. 10 Min.	vacuum drying at least 15 minutes
wrapped Utensils Instruments	fractionated vacuum	1,2 bar 2,4 bar	121 °C 134 °C	20 Min. 15 Min.	vacuum drying at least 15 minutes
unwrapped wrapped Textiles	fractionated vacuum	1,2 bar 2,4 bar	121 °C 134 °C	30 Min. 20 Min.	vacuum drying at least 30 minutes
unwrapped wrapped Hollow bodies	fractionated vacuum	1,2 bar 2,4 bar	121 °C 134 °C	20 Min. 15 Min.	vacuum drying at least 20 minutes

If a loading from different goods and packaging materials is treated in a cycle together, the setting is to be chosen for the good most difficultly to be sterilised.

If a loading from goods with a sterilizing temperature of 121 °C and 134 °C is treated in a cycle together, the setting is to be chosen for the good more sensitive to temperature.

8. Maintenance of Sterilizer

8.1. General

In case of external contamination of unit and inner chamber, clean these parts moistly. When the switchboard is cleaned, separate it first from mains supply.

The inner chamber must always be kept clean. If necessary, wash it out, let off the liquid via the emptying valve (25) and rinse.

If the water of the outer chamber becomes turbid, - to be seen on the level glass (6) - the water can be let off via the emptying valve (31).

In case of calcareous water, the apparatus has to be decalcified once a year. These intervals can be extended when the outer chamber is emptied regularly.

8.2. Maintenance of Chamber Gasket

In course of time the sterilizer gasket (33) is subject to a natural wear and tear and has to be exchanged, if necessary, e.g. if it is deformed or damaged or if during sterilization steam escapes at the gasket.

To achieve a longer durability of the door gasket and to guarantee a safe tightening between chamber and door blade, the blocking resistance of the chamber gasket must be maintained continuously.

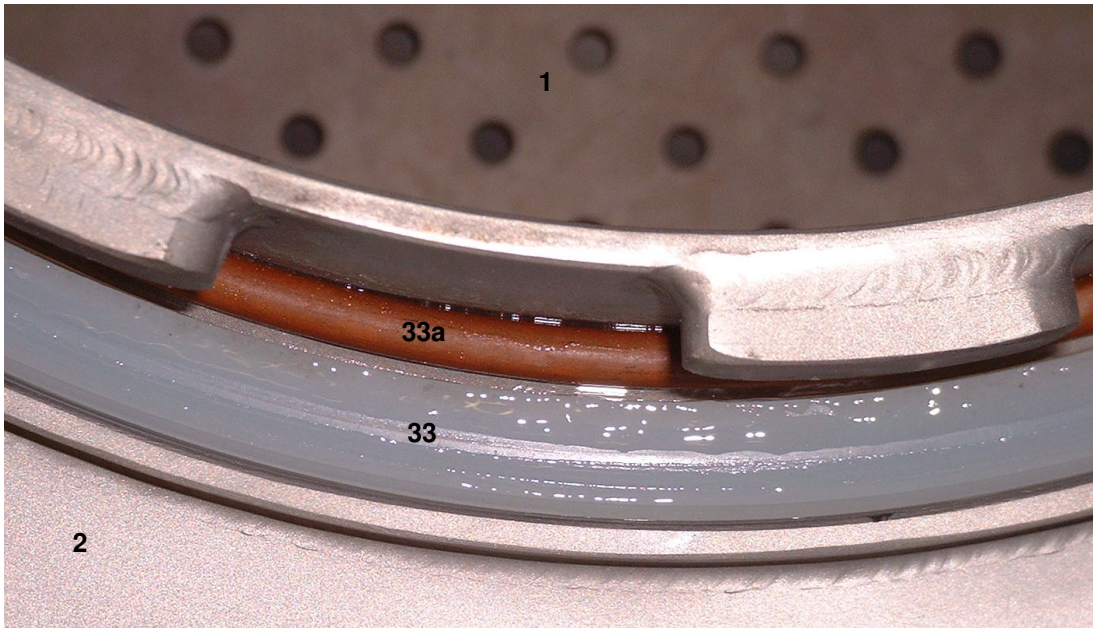
The gasket has to be removed from the gasket groove, cleaned and greased daily, before put into operation with silicone grease. Cleaning of the gasket should be done when the unit is cold. For protecting the hands, the use of one-way rubber gloves is recommendable.

As the grease looses its separating ability also when the unit is not used, the maintenance intervals depend not only on the frequency of use, but also on the blocking resistance of the chamber gasket.

The gasket (33) and the copper ring (33a) has to be removed from the gasket groove by the S-shaped gasket-drawer. Then the gasket (33) and the copper ring (33a) has to be cleaned by a fluff-free cloth. Afterwards the gasket (33) has to be checked, whether there are no wear and tear spots or damages. A defective or worn-out gasket has to be replaced.

Afterwards the gasket groove must be cleaned. For greasing the gasket, take a small quantity (approx. the size of a walnut) of grease on the palm of one hand and rub it between both palms, before you draw the gaskets through your hands. Then put the copper ring (33a) and the greased gasket (33) back into the gasket groove.

We recommend that you always dispose of s spare gasket, as a defective gasket makes it impossible to operate the unit and causes an unnecessary stop.



8.3. Aeration filter

Acc. to its construction the aeration filter guarantees a safe air sterilization and makes it possible to exchange the filter elements easily.

Our service staff is instructed to exchange the filter elements acc. to the frequency of use under consideration of the local conditions, as dust and humidity.

To guarantee the operation safety of the sterilizer and to prevent a recontamination of the sterile goods, it is necessary that the filter elements are regularly exchanged during maintenance works.

Acc. to DIN 58 946 part 6 / 10.2.1 the filter inset of the aeration filter has to be renewed **every six months**.

9. Search for Errors

Temperature indication does not work

-> stream obstructed
-> condensate trap defective

No pressure in the outer chamber

-> no water in the outer chamber
-> no current / fuse defective
-> water shortage protection disengaged

Chamber gasket leaky

-> gasket defective
-> dirt on the gasket
-> gasket has to be greased

10. Short Operating Instructions

for vertical autoclave KSG 40/60, 50/70, 50/80 and 50/95 double-walled without sterilization timer, contact thermometer

Working according to these short operating instructions is only allowed to persons, who understood the operating instructions and are able to operate the unit accordingly.

10.1. Filling in of jacket water

Open filling valve (5) and sterilization valve (9), fill outer jacket (2) via filling funnel (4) with distilled water up to max. filling (6). Then close filling valve (5) and sterilization valve (9) again.

Close hand valves (25) and (29), if still open.

10.2. Heating up Jacket

Actuate on/off-switch (13) and switch on heating (10) in the steam jacket (2).

Adjust pressure at the pressure regulator (21).

10.3. Loading Chamber

Fill the chamber (1) with the goods to be sterilized and close the lid (3).

10.4. Close Lid

Tilt the lid downwards
Close operation lever (24) for function safety valve (23).

10.5. starting the fractioned vacuum

For starting the vacuum functions open the hand valve (25) and then switch on the electric motor vacuum pump (28) by actuating switch (13a).

10.6. end the fractioned vacuum

To end the vacuum functions, close the hand valve (25) and then switch off the electric motor vacuum pump (28) by actuating switch (13a).

10.7. starting the steam push

For starting the steam push, careful opening of the sterilization valve (9).
At least a pressure of 0,5 bar (1500 absolute pressure) should be reached in chamber (1).

10.8. end the steam push

complete close of the sterilization valve (9).

10.9. For fractionated vacuum

Repeat the steps 10.5 - 10.8 from four to six times.

10.10. Sterilization:

Control the outer chamber pressure at the pressure gauge for steam jacket (20) and adjust at the pressure regulator (21), if necessary (see chapter 4.2 and 4.3).

Open sterilization valve (9) slowly and completely.

Count the time only when the temperature at the pointer thermometer (34) is high enough (121 °C or 134 °C). Wait until the end of the sterilizing phase.

Close sterilization valve (9).

10.11. Vacuum drying:

Close sterilization valve (9).

For vacuum drying press switch (13a) to switch on the electric motor vacuum pump (28).

Open release valve for chamber pressure (25) carefully.

10.12. End vacuum drying

For ending the vacuum drying step close the release valve for chamber pressure (25) and press switch (13a) again to switch off the electric motor vacuum pump (28).

10.13. Ventilation of chamber

To ventilate the sterilizing chamber (1) via ventilation filter (35), the ventilation valve (34) must be opened.

10.14. Open lid – remove goods

After pressure equalization has been achieved in the chamber (1) - pressure gauge (19) for the sterilizing chamber must be "0" bar.

Open function safety valve (23) at the operation lever (24) and open the sterilizer lid (3).

Now the - possibly still hot - sterile goods can be removed.

11. Technical Data

Typ	Chamber Diameter / Height / Volume			Current	Capacity	Operating Water to NW	Operating Water NW to HW
40/60 -2	40 cm	60 cm	075 dm^3	14,5 A	9,5 kW	25 Litres	16 Litres
50/70 -2	50 cm	70 cm	137 dm^3	19,0 A	12,5 kW	42 Litres	21 Litres
50/80 -2	50 cm	80 cm	157 dm^3	19,0 A	12,5 kW	40 Litres	18 Litres
50/95 -2	50 cm	95cm	186 dm^3	19,0 A	12,5 kW	XX Litres	XX Litres

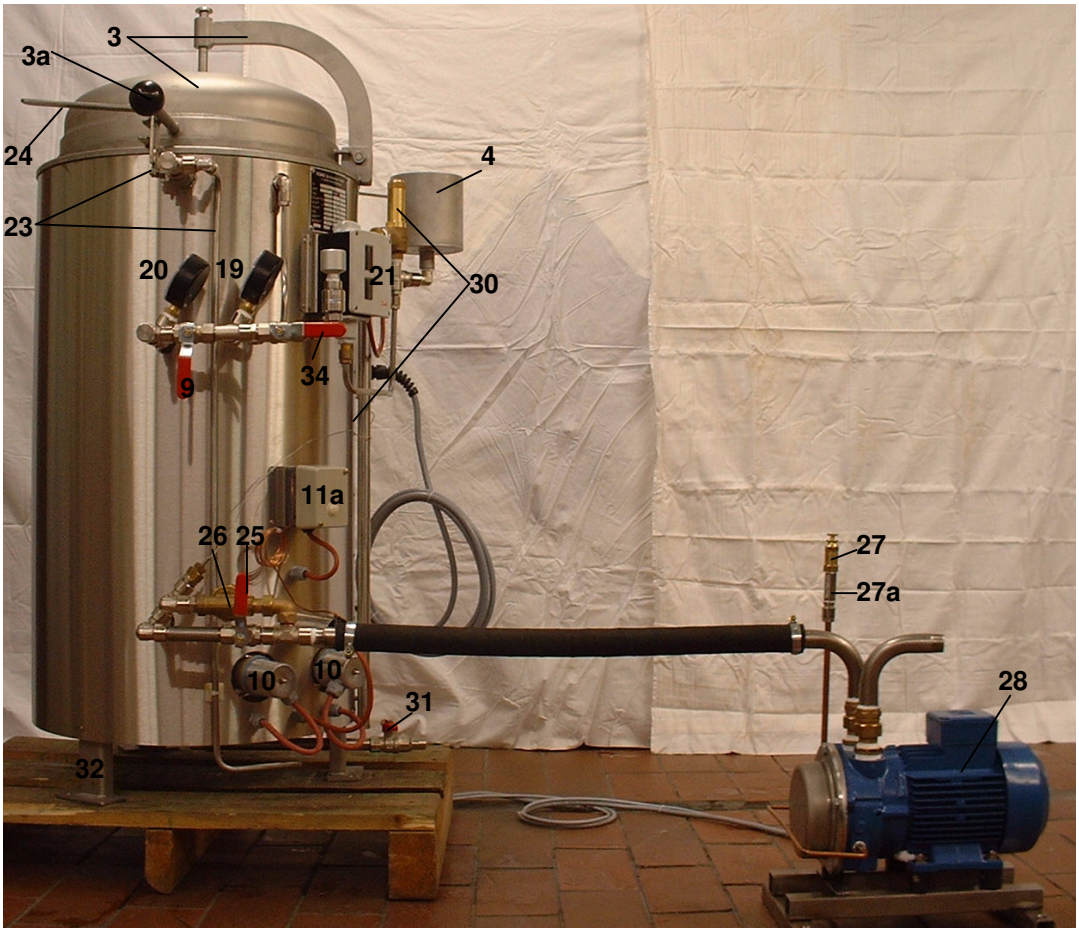
Operating pressure p_e :	2,5 bar
Operating temperature:	134 °C
Nominal voltage:	230/400 V
Current:	Rotary current
Nominal frequency:	50/60 Hz

12. Legend

1	Sterilizing chamber
2	Outer chamber / steam jacket
3	Sterilizer lid with swivel bow
3 a	Operation handles for (3)
4	Filling funnel for distilled/demineralized water
5	Filling valve
5 a	Flap trap for (5)
6	Water level with protective covering
7	Water level valve, top
8	Water level valve, bottom
8 a	Emtying valve for Waterlevel
9	Sterilization valve
1 0	Plunger-type radiators (2x)
1 1	Water shortage sensor with micro radiator
1 1 a	Water shortage protected switch, resettable
1 2	Switch box / electric control case
1 3	ON/OFF switch / main switch
13a	ON/OFF switch / electric motor vacuum pump
1 6	Control lamp "heating" (yellow)
1 7	Control lamp "water shortage" (red)
1 8	Indicating thermometer for (1)
1 9	Pressure gauge for sterilizing chamber (1)
2 0	Pressure gauge for steam jacket (2)
2 1	Adjusting device for sterilizing pressure with regulation
2 2	Flap trap
2 3	Function safety valve (with exhaust tube)
2 4	Operating lever for (23)
2 5	Release valve for chamber pressure (for sterilizing chamber)
2 6	Automatic aerator and deaerator
2 7	Sniffing valve (breathe in valve)
2 7 a	One way ball valve
2 8	electric motor vacuum pump
2 8 a	Flap trap for (28)
2 9	Inlet magnetic valve for cooling water for (28)
2 9 a	Needle valve
2 9 b	Dirt sieve
3 0	Safety valve (with exhaust tube)
3 1	Emptying valve for (2)
3 2	Apparatus feet with fixation holes
3 2 a	Fixation holes for vacuum pump
3 3	Gasket for (1) / (3)
3 3 a	copper ring for Gasket (33)
3 4	Aeration valve
3 5	Aeration filter
3 5 a	Flap trap for (35)

Remark:

All valves are in closed position when they are moved clockwise - seen on the operation handle - until the limit stop.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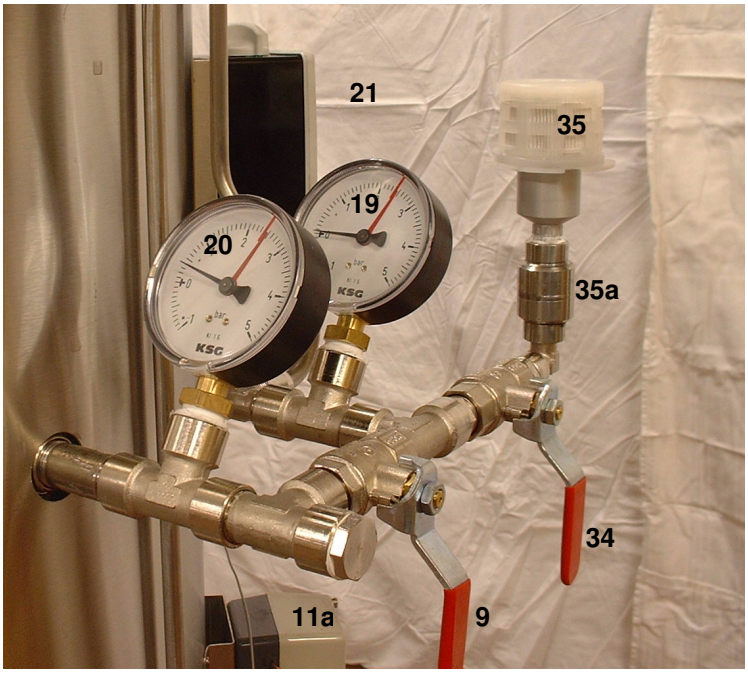
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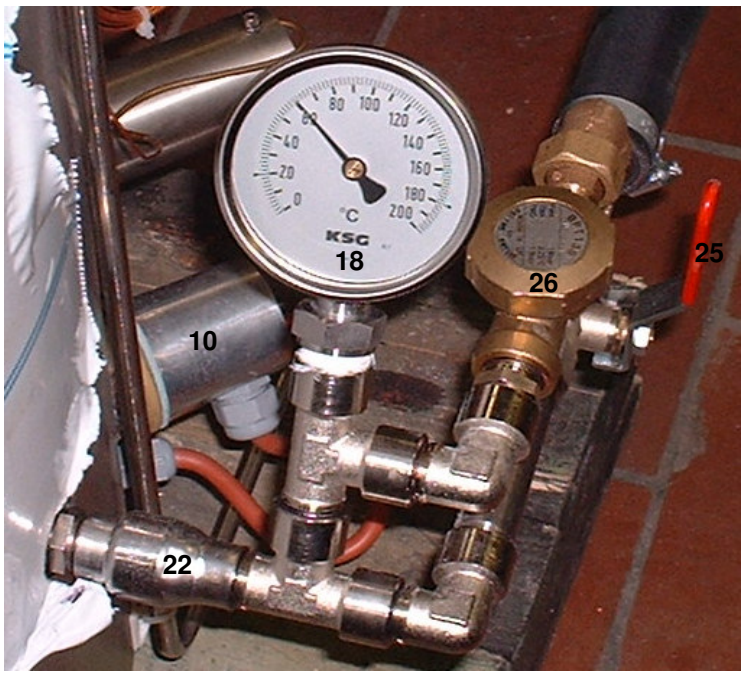
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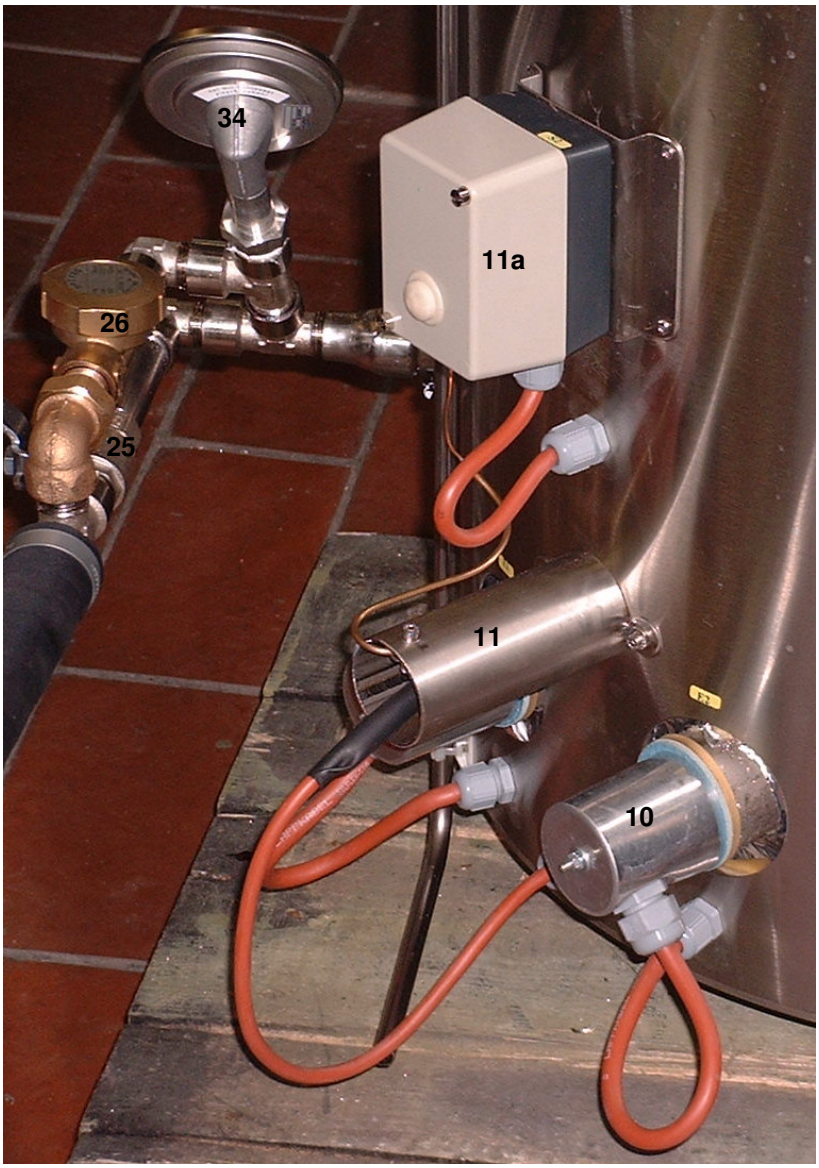
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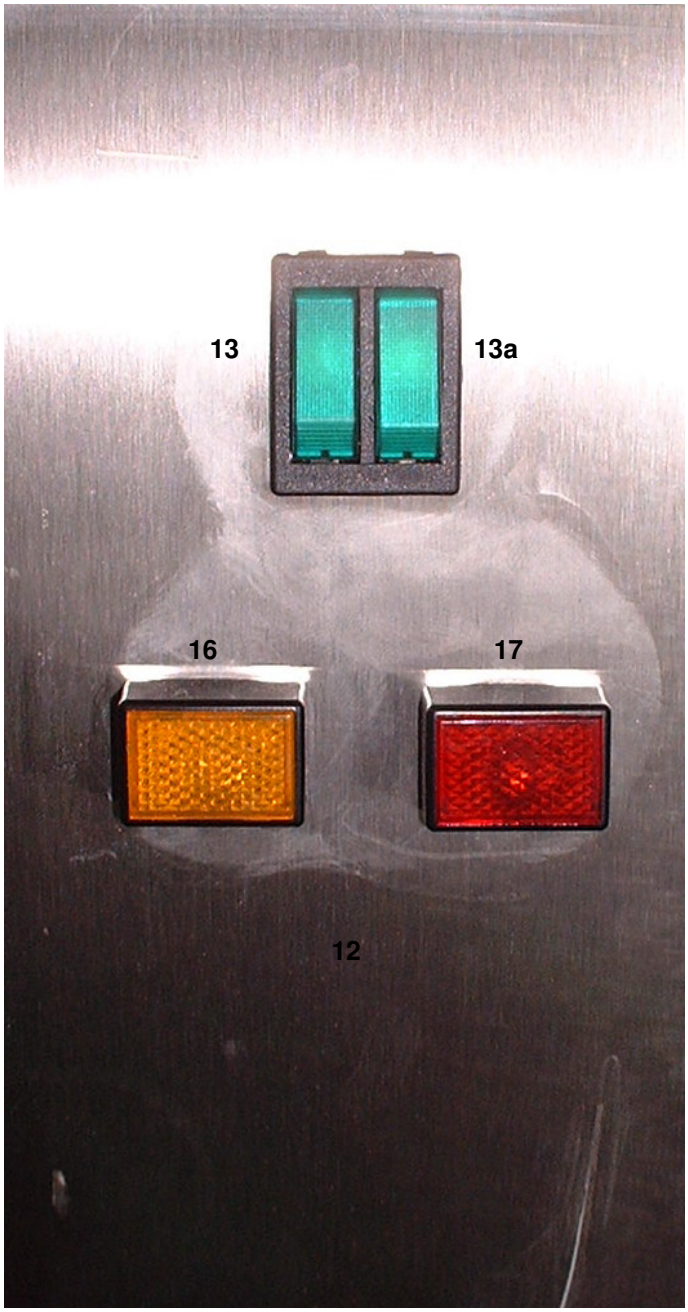
KSG Sterilisatoren GmbH
D-82110 Olching/Germany
Danfoss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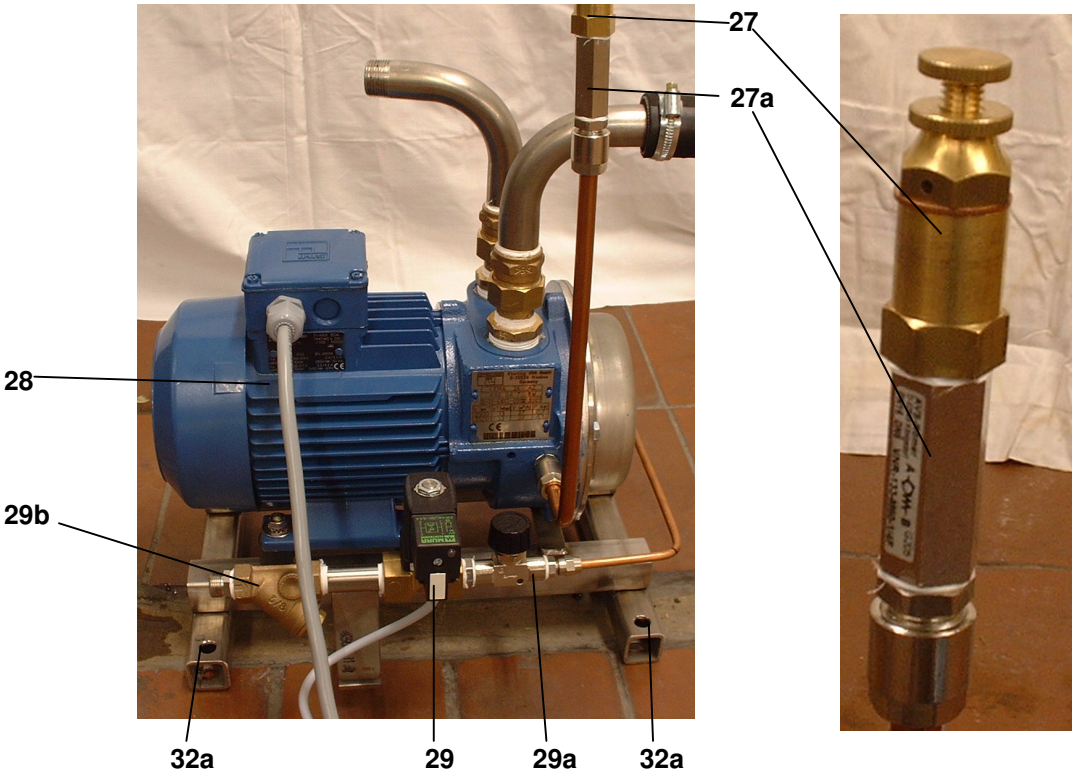
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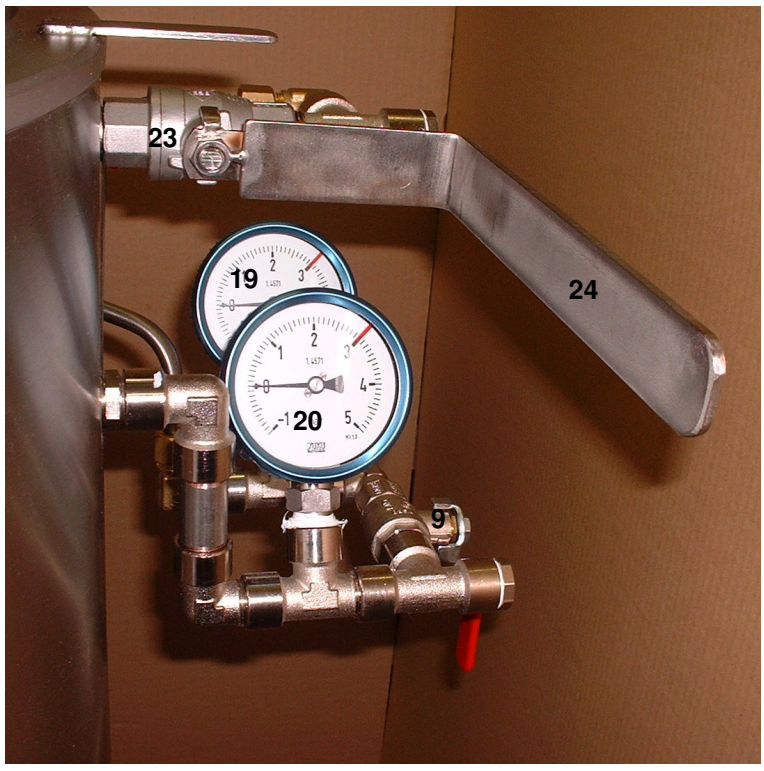
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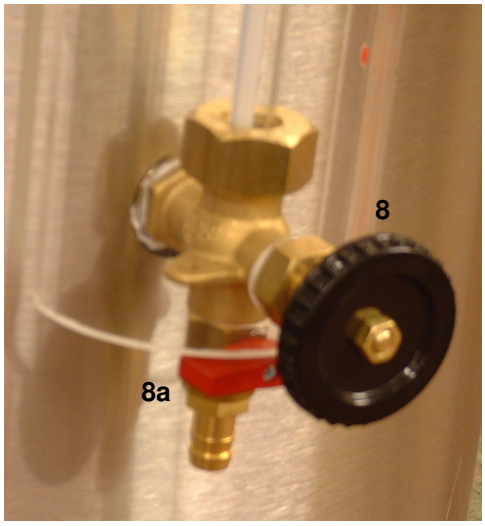
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